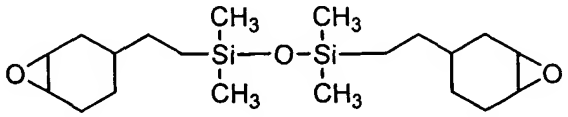
## Claims

I claim:

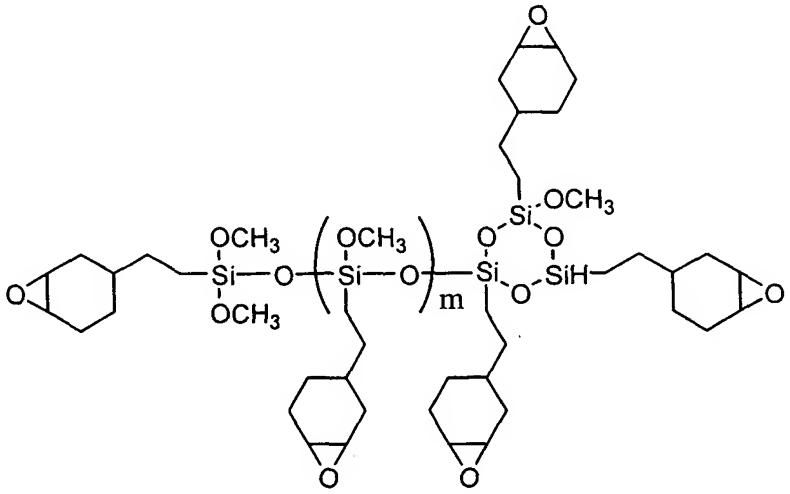
1. A clear coating composition comprising from about 90 to about 100 parts by weight of a base resin; from 0 to about 2 parts of an adhesion promoter; and from about 3 to about 8 parts by weight of a cationic polymerization initiator, wherein said base resin comprises:

(A) from about 30 to about 50 parts by weight of a cycloaliphatic epoxy functional siloxane monomer having structure (IA)



(IA)

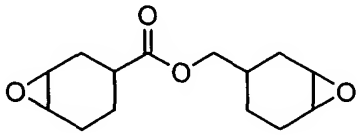
(B) from 0 to about 30 parts by weight of a cycloaliphatic epoxy functional siloxane oligomer having structure (IB)



(IB)

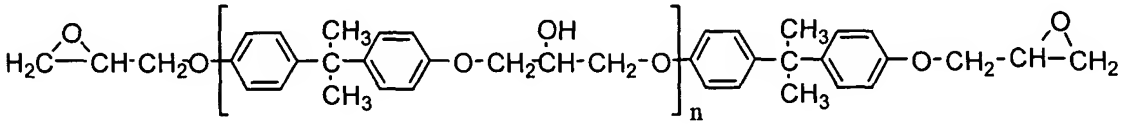
wherein m is an integer having a value from 5 to 50;

(C) from about 20 to about 50 parts by weight of at least one non-silicon-containing epoxy resin selected from the group consisting of (i) epoxidized vegetable oils, (ii) epoxidized vegetable oil esters, and (iii) 3,4-epoxycyclohexyl 3',4'-epoxycyclohexane carboxylate having structure (IIA)



(IIA)

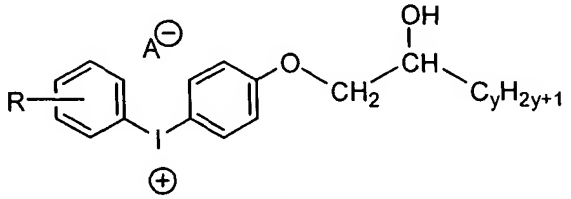
(D) from 0 to about 30 parts by weight of one or more flexibilizers selected from the group of (i) epoxides based on a diglycidyl ether of bisphenol A having structure (IIB)



(IIB)

wherein the average value of n is 0 or about 0.07, 0.14, 2.3 or 4.8; (ii) epoxidized alpha olefins; (iii) limonene oxides; (iv) thermoplastic acrylic resins; (v) elastiomers; (vi) phenoxy resins; (vii) polyol flexibilizers; and (viii) allyl ethers; and

wherein said cationic polymerization initiator comprises at least one diaryliodonium salt, wherein each said diaryliodonium salt is present in a corresponding separate catalyst solution comprising from about 40 to about 80 wt. % of a carrier medium and from about 20 to about 60 wt. % of said diaryliodonium salt, and wherein each said diaryliodonium salt has structure (III)



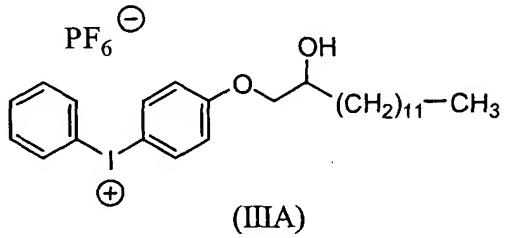
(III)

wherein R is methyl or hydrogen; y is 0 or an integer from 1 to 25; and $A^-$ is a non-nucleophilic anion selected from the group consisting of $[BF_4]^-$, $[PF_6]^-$, $[AsF_6]^-$, $[SbF_6]^-$, $[B(C_6F_5)_4]^-$, and $[Ga(C_6F_5)_4]^-$.

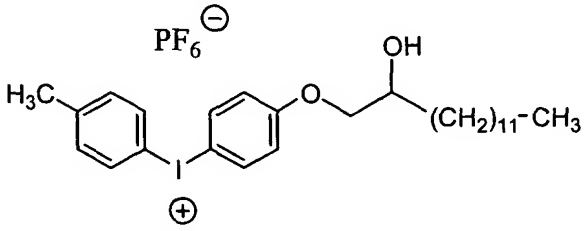
2. The clear coating composition of claim 1, wherein said adhesion promoter is 3-glycidyloxypropyltrimethoxysilane or 2-(3,4-epoxycyclohexyl)-ethyl trimethoxysilane.

3. The clear coating composition of claim 1, wherein said cationic polymerization initiator comprises:

(A) from 0 to about 8 parts by weight of a phosphate catalyst solution comprising from about 20 to about 60 wt. % of at least one diaryliodonium phosphate salt selected from the group consisting of [4-(2-hydroxy-1-tetradecyloxy)-phenyl] phenyliodonium hexafluorophosphate having structure (IIIA) and [4-(2-hydroxy-1-tetradecyloxy)-phenyl] 4-methylphenyliodonium hexafluorophosphate having structure (IIIB)



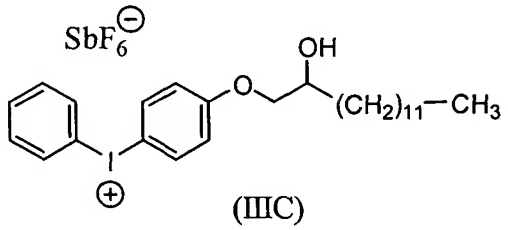

(IIIA)



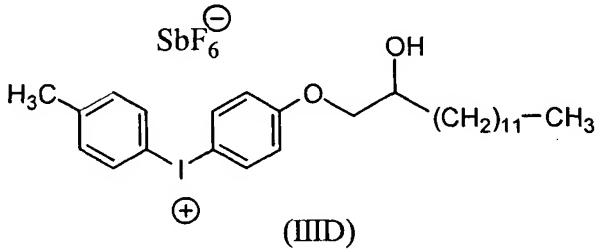

(IIIB)

wherein each said at least one selected diaryliodonium phosphate salt is in solution with from about 40 to about 80 wt. % of said carrier medium, wherein

said carrier medium is selected from the group of 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate and bis (3,4-epoxycyclohexyl) adipate; and (B) from 0 to about 4 parts by weight of an antimonate catalyst solution comprising from about 20 to about 60 wt. % of at least one iodonium antimonate salt selected from the group of [4-(2-hydroxy-1-tetradecyloxy)-phenyl] phenyliodonium hexafluoroantimonate having structure (IIIC) and [4-(2-hydroxy-1-tetradecyloxy)-phenyl] 4-methylphenyliodonium hexafluoroantimonate having structure (IIID)




(IIIC)




(IIID)

wherein each said at least one selected iodonium antimonate salt is in solution with from about 40 to about 80 wt. % of said carrier medium wherein said carrier medium is selected from the group consisting of 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate and bis(3,4-epoxycyclohexyl) adipate.

4. The clear coating composition of claim 3, wherein

(A) said iodonium phosphate catalyst solution comprises about 40 wt. % of each said at least one selected diaryliodonium phosphate salt having structure (IIIA) or (IIIB) and about 60 wt. % of said 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate; and

(B) said iodonium antimonate catalyst solution comprises about 40 wt. % of each said at least one selected diaryliodonium antimonate salt having structure (IIIC) or (IIID) and about 60 wt. % of said 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate.

5. The clear coating composition of claim 3, wherein said base resin comprises:

(A) from about 35 to about 40 parts by weight of said cycloaliphatic epoxy functional siloxane monomer having structure (IA);

(B) from 0 to about 15 parts by weight of said cycloaliphatic epoxy functional siloxane oligomer having structure (IB);

(C) from about 28 to about 40 parts by weight of said at least one non-silicon-containing epoxy resin; and

(D) from about 9 to about 17 parts by weight of said epoxide based on a diglycidyl ether of bisphenol A having structure (IIB).

6. The clear coating composition of claim 5, wherein

(A) said iodonium phosphate catalyst solution comprises about 40 wt. % of each said at least one selected diaryliodonium phosphate salt having structure (IIIA) or (IIIB) and about 60 wt. % of said 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate; and

(B) said iodonium antimonate catalyst solution comprises about 40 wt. % of each said at least one selected diaryliodonium antimonate salt having structure (IIIC) or (IIID) and about 60 wt. % of said 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate.

7. The clear coating composition of claim 4, wherein said cationic polymerization initiator comprises:

(A) about 4 parts by weight of said iodonium phosphate catalyst solution; and

(B) about 2 parts by weight of said iodonium antimonate catalyst solution.

8. The clear coating composition of claim 4, wherein said cationic polymerization initiator comprises:

(A) about 3 parts by weight of said iodonium phosphate catalyst solution; and

(B) about 1 part by weight of said iodonium antimonate catalyst solution.

9. The clear coating composition of claim 4, wherein said cationic polymerization initiator comprises equal parts by weight of said iodonium phosphate catalyst solution and of said iodonium antimonate catalyst solution, wherein the amount of each said catalyst solution ranges from about 2 to about 4 parts by weight.

10. The clear coating composition of claim 4, wherein said cationic polymerization initiator comprises:

(A) 0 parts by weight of said iodonium phosphate catalyst solution; and

(B) from about 2 to about 4 parts by weight of said iodonium antimonate catalyst solution.

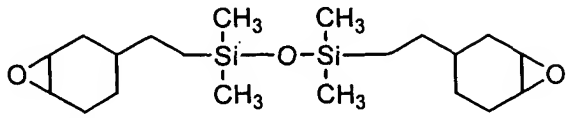
11. The clear coating composition of claim 4, wherein said cationic polymerization initiator comprises:

(A) from about 4 to about 8 parts by weight of said iodonium phosphate catalyst solution; and

(B) 0 parts by weight of said iodonium antimonate catalyst solution.

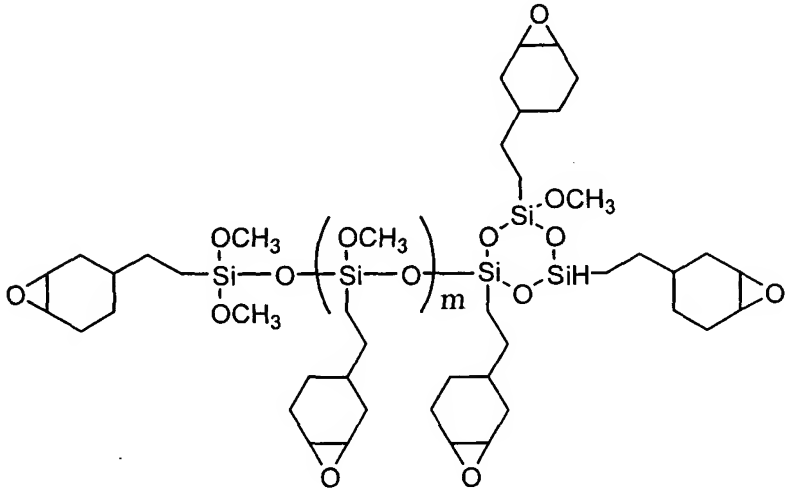
12. A coating composition comprising from about 35 to about 62 parts by weight of a base resin; from about 32 to about 65 parts by weight of one or more components selected from the group consisting of fillers, pigments, diluents, toughеners, flow control agents, and antifoaming agents; from 0 to about 1 part of an adhesion promoter; and from about 2 to about 5 parts by weight of a cationic polymerization initiator, wherein said base resin comprises:

(A) from about 30 to about 50 parts by weight of a cycloaliphatic epoxy functional siloxane monomer having structure (IA)



(IA)

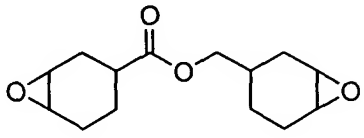
(B) from 0 to about 30 parts by weight of a cycloaliphatic epoxy functional siloxane oligomer having structure (IB)



(IB)

wherein m is an integer having a value from 5 to 50;

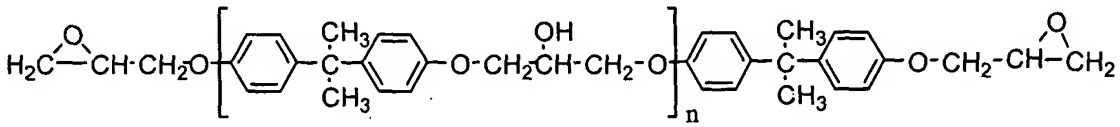
(C) from about 20 to about 50 parts by weight of at least one non-silicon-containing epoxy resin selected from the group consisting of (i) epoxidized vegetable oils, (ii) epoxidized vegetable oil esters, and (iii) 3,4-epoxycyclohexyl 3',4'-epoxycyclohexane carboxylate having structure (IIA)



(IIA)

and

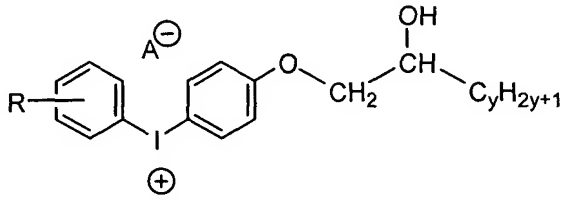
(D) from 0 to about 30 parts by weight of one or more flexibilizers selected from the group of (i) epoxides based on a diglycidyl ether of bisphenol A having structure (IIB)



(IIB)

wherein the average value of n is 0 or about 0.07, 0.14, 2.3 or 4.8; (ii) epoxidized alpha olefins; (iii) limonene oxides; (iv) thermoplastic acrylic resins; (v) elastiomers; (vi) phenoxy resins; (vii) polyol flexibilizers; and (viii) allyl ethers; and

wherein said cationic polymerization initiator comprises at least one diaryliodonium salt, wherein each said diaryliodonium salt is present in a corresponding separate catalyst solution comprising from about 40 to about 80 wt. % of a carrier medium and from about 20 to about 60 wt. % of said diaryliodonium salt, and wherein each said diaryliodonium salt has structure (III)



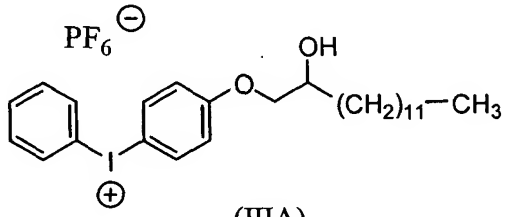
(III)

wherein R is methyl or hydrogen; y is 0 or an integer from 1 to 25; and $A^-$ is a non-nucleophilic anion selected from the group consisting of $[BF_4]^-$, $[PF_6]^-$, $[AsF_6]^-$, $[SbF_6]^-$, $[B(C_6F_5)_4]^-$, and $[Ga(C_6F_5)_4]^-$.

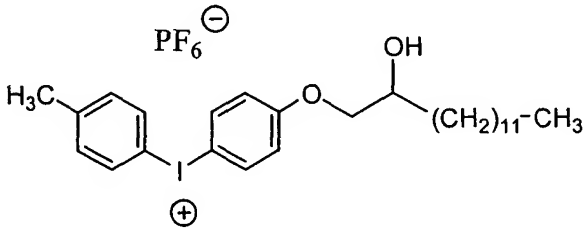
13. The coating composition of claim 12, wherein said adhesion promoter is 3-glycidyloxypropyltrimethoxysilane or 2-(3,4-epoxycyclohexyl)-ethyl trimethoxysilane.

14. The coating composition of claim 12, wherein said cationic polymerization initiator comprises:

(A) from 0 to about 4.4 parts by weight of a phosphate catalyst solution comprising from about 20 to about 60 wt. % of at least one diaryliodonium phosphate salt selected from the group consisting of [4-(2-hydroxy-1-tetradecyloxy)-phenyl] phenyliodonium hexafluorophosphate having structure (IIIA) and [4-(2-hydroxy-1-tetradecyloxy)-phenyl] 4-methylphenyliodonium hexafluorophosphate having structure (IIIB)




(IIIA)



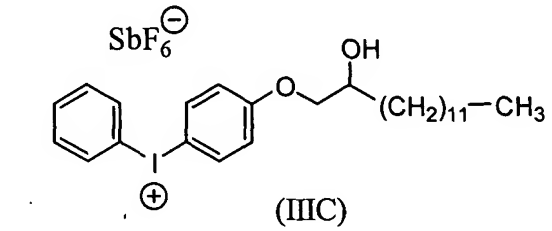

(IIIB)

wherein each said at least one selected diaryliodonium phosphate salt is in solution with from about 40 to about 80 wt. % of said carrier medium, wherein said carrier medium is selected from the group consisting of 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate and bis (3,4-epoxycyclohexyl) adipate; and

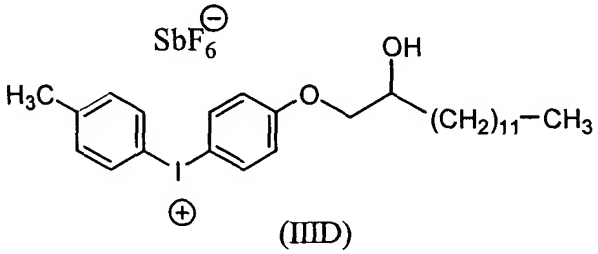
and

(B) from 0 to about 4 parts by weight of an antimonate catalyst solution comprising from about 20 to about 60 wt. % of at least one iodonium antimonate salt selected from the group of [4-(2-hydroxy-1-tetradecyloxy)-phenyl] phenyliodonium hexafluoroantimonate having structure (IIIC) and [4-

(2-hydroxy-1-tetradecyloxy)-phenyl] 4-methylphenyliodonium hexafluoroantimonate having structure (IIID)




(IIIC)




(IIID)

wherein each said at least one selected iodonium antimonate salt is in solution with from about 40 to about 80 wt. % of said carrier medium wherein said carrier medium is selected from the group consisting of 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate and bis(3,4-epoxycyclohexyl) adipate.

15. The coating composition of claim 14, wherein

(A) said iodonium phosphate catalyst solution comprises about 40 wt. % of each said at least one selected diaryliodonium phosphate salt having structure (IIIA) or (IIIB) and about 60 wt. % of said 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate; and

(B) said iodonium antimonate catalyst solution comprises about 40 wt. % of each said at least one selected diaryliodonium antimonate salt having structure (IIIC) or (IIID) and about 60 wt. % of said 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate.

16. The coating composition of claim 14, wherein said base resin comprises

(A) from about 40 to about 45 parts by weight of said cycloaliphatic epoxy functional siloxane monomer having structure (IA);

(B) from about 5 to about 15 parts by weight of said cycloaliphatic epoxy functional siloxane oligomer having structure (IB);

(C) from about 32 to about 40 parts by weight of said at least one non-silicon-containing epoxy resin; and

(D) from about 5 to about 10 parts by weight of said epoxide based on a diglycidyl ether of bisphenol A having structure (IIB).

17. The coating composition of claim 16, wherein

(A) said iodonium phosphate catalyst solution comprises about 40 wt. % of each said at least one selected diaryliodonium phosphate salt having structure (IIIA) or (IIIB) and about 60 wt. % of said 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate; and

(B) said iodonium antimonate catalyst solution comprises about 40 wt. % of each said at least one selected diaryliodonium antimonate salt having structure (IIIC) or (IIID) and about 60 wt. % of said 3,4-epoxycyclohexylmethyl-3',4'-epoxycyclohexane carboxylate.

18. The coating composition of claim 15, wherein said cationic polymerization initiator comprises equal parts by weight of said iodonium phosphate catalyst solution and of said iodonium antimonate catalyst solution, wherein the amount of each said catalyst solution ranges from about 1 to about 2.5 parts by weight.

19. The coating composition of claim 15, wherein said cationic polymerization initiator comprises:

(A) about 3 parts by weight of said phosphate catalyst solution; and

(B) about 1 part by weight of said antimonate catalyst solution.

20. The coating composition of claim 15, wherein said cationic polymerization initiator comprises:

(A) 0 parts by weight of said phosphate catalyst solution; and

(B) from about 2 to about 4 parts by weight of said antimonate catalyst solution.

21. The coating composition of claim 15, wherein said cationic polymerization initiator comprises:

(A) from about 2 to about 4 parts by weight of said phosphate catalyst solution; and

(B) 0 parts by weight of said antimonate catalyst solution.

22. A method for manufacturing a coated article comprising:

(A) applying said composition of claim 1 to an article comprising wood, glass, plastic, or metal; and

(B) exposing said article and applied composition to E-beam radiation ranging from about 3 to about 12 Mrad or heating said article and applied composition to a first maximum substrate temperature ranging from about 150 °C to about 260° C, whereby polymerization occurs to > 90% during said exposure to E-beam radiation or during said heating to said first maximum substrate temperature.

23. The method of claim 22 additionally comprising after step (B) the step of:

(C) heating said exposed or heated article and applied composition to a second maximum substrate temperature ranging from about 80 °C to about 125° C.

24. A method for manufacturing a coated article comprising:

(A) applying said composition of claim 12 to an article comprising wood, glass, plastic, or metal; and

(B) exposing said article and applied composition to E-beam radiation ranging from about 3 to about 12 Mrad or heating said article and applied composition to a first maximum substrate temperature ranging from about 150 °C to about 260° C, whereby polymerization occurs to > 90% during said exposure to E-beam radiation or during said heating to said first maximum substrate temperature.

25. The method of claim 24 additionally comprising after step (B) the step of:

(C) heating said exposed or heated article and applied composition to a second maximum substrate temperature ranging from about 80 °C to about 125° C.

26. A coated article manufactured by said method of claim 22.

27. A coated article manufactured by said method of claim 24.